

A SURVEY OF METHODS USED BY NURSE-MIDWIVES
TO FACILITATE DELIVERY OVER AN
INTACT PERINEUM

by

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ABSTRACT

The purpose of this study was to determine the attitudes of nurse-midwives concerning delivery over an intact perineum, their techniques utilized to facilitate delivery over an intact perineum, and the effectiveness of these techniques.

Questionnaires were mailed to 175 C.N.M.s. One hundred and thirteen were returned completed. More than half of the 113 respondents in this study graduated from nurse-midwifery schools within the past six years and have four years or less of clinical practice. Twenty-two schools of nurse-midwifery and 34 states are represented.

A large majority of the respondents do not do routine episiotomies and prefer to deliver over an intact perineum whenever possible.

Varied and numerous techniques are used by these C.N.M.s to facilitate delivery over an intact perineum. A large majority teach breathing and pushing techniques, Kegels exercise, and tailor sitting/squatting during pregnancy. Most do not use any special techniques during the first stage of labor. During the second stage of labor, most practitioners prefer to maintain flexion of the fetal head, to use some kind of perineal massage or support, and to not use anesthesia. The preferred positions for delivery are the lithotomy position (flat or raised) without stirrups and the lateral Sims position. Gentle,

intermittent pushing is preferred.

The techniques reported to be most helpful to successful delivery over an intact perineum include having a controlled, prepared client, a delivery position with legs relatively close together, using gentle pushing and pushing between contractions, assuring a very slow delivery and delivery between contractions, maintaining flexion of the baby's head, and having the woman pant or breathe the head out.

The techniques that participants reported most often to be detrimental to delivery over an intact perineum include using stirrups and/or having the legs far apart, hard pushing, hurrying, and having an uncontrolled, unprepared client.

The success of the techniques utilized was unable to be determined from the available data. Success rates were calculated for the 36 respondents for whom delivery statistics were available. These success rates were widespread and varied from 8% to 100%. Success was neither related to the race or tissue integrity of client populations, nor to practitioners' preferences about delivery over intact perineums. Success was not correlated with the number of years of clinical practice.

It was concluded from this study that nurse midwives are interested in learning more and better methods of delivering over an intact perineum. The efforts of present-day nurse-midwives to protect the perineum during childbirth are as varied and numerous as those that have been

used historically. The old methods--oils, heat, support, herbs--are all represented in current practice.

Limitations to the study were examined and recommendations for further study in this area were made. Implications for nurse-midwifery practice and education were discussed.

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CHAPTER I

INTRODUCTION

The protection of the intact perineum during childbirth has been the focus of study and speculation for many centuries. The perineum is the external region between the vulva and the anus. It is comprised of skin, fat, the connective tissue of the centrum tendinum, the transverse perineal muscle, and the muscles of the anterior portion of the levator ani.

These tissues are particularly prone to lacerations during the second stage of labor. Maternal causes of lacerations include: (1) uncontrolled or precipitate delivery; (2) the woman's inability to stop bearing down; (3) excess fundal pressure; (4) perineal tissue edema and friability; (5) vulvar varicosities; (6) a narrow pubic arch that forces the head posteriorly; (7) rigid or contracted perineal muscles; and (8) diminished skin elasticity from scars, age, or constitution (Clarke, 1889; Goodell, 1871; Greenhill & Friedman, 1974, p. 257-258; Hodgkinson, 1958; Oxorn & Foote, 1975, p. 415). Characteristics of the fetus can also contribute to perineal lacerations: (1) large baby; (2) abnormal positions or presentations; (3) shoulder dystocia; and (4) congenital anomalies (e.g., hydrocephaly) (Greenhill & Friedman, 1974, p. 257-258; Oxorn & Foote, 1975, p. 415).

The estimation of the incidence of perineal lacerations varies.

According to Clarke (1889) and Dewees (1889), lacerations occurred in 15% to 40% of all primiparas and 5% to 10% of all multiparas. Greenhill and Friedman (1974, p. 257-258), however, estimated that 70% of all primiparas lacerate during the second stage of labor. Most are first degree lacerations (involving mucosa, fourchette, and skin), but 25% of these primiparas and 10% of multiparas have second degree lacerations (involving muscle but not the rectal sphincter).

The earliest known remedies employed to protect the perineum from lacerations were external applications of oils and emollients. Hippocrates and Aristotle were purported to have used salves and douches to soften and relax the perineum (Cogan & Edmunds, 1977). In the late 1500s and early 1600s, European midwives applied oil of white lilies to the parturient perineum. Other emollients used over the years included warm olive oil, almond and linseed oils (Goodell, 1871). As late as 1781, Professor Hamilton of Edinburgh recommended the use of lubricants to facilitate sliding the perineum over the face and chin of the child (Leishman, 1879). Although oils and emollients continued to be used for many years, their use has been severely criticized. Charles White (1793) condemned them as unnecessary, claiming they can destroy the moistening and lubricating action of the natural mucus. Goodell (1871) similarly and poignantly states:

Why besmear the maternal passages with oil or lard
and thus dilute and decompose those bland and alkaline

secretions which a provident nature has usually so plentifully supplied for aiding the strictly physiological processes of labor? . . . My own practice is to discard the use of lard, to let the vagina alone, and to content myself with keeping the cutaneous surface of the perineum well smeared with the surplus mucus which escapes from the vulva. (p. 79)

Internal as well as external remedies were employed as a means of perineal protection. Of early popularity was warm olive oil, oil of lilies, infusion of saffron, of swallow's nest, and especially of sage leaves. The latter was in high repute because, according to Mercatus, it was well known that lionesses chewed this plant in order to have easy labors. Nicholas Culpepper in 1671 avoided lacerations by having women drink white amber or lily water (Goodell, 1871).

In the eighteenth and nineteenth centuries, it appears that perineal support was the most widely used method of protecting the intact perineum. Although it is thought by some that Puzos in 1747 was the first advocate of manual support of the perineum (Goodell, 1871), it is claimed by others that Soranus, in first and second century Rome, instructed the midwives to support the perineum with a linen pad as the head advanced at birth (Cogan & Edmunds, 1977). Whenever it was first described, the technique became so popular that by the mid-1800s, "'support the perineum' has become the watchword of all the schools of midwifery" (Goodell, 1871, p. 65).

The methods of and reasons for applying support were varied and numerous. Goodell (1871) aptly summarized the confused state of the art:

There are those who make pressure upon the perineum to retard the head; those who make pressure to accelerate its advance; those who deny that any such effects can be thus produced; and those who conscientiously use support because something must be done.

Again there are those who direct all the pressure at the fourchette; others who reprehend this, and as carefully guard the posterior perineum; and yet others who will not touch the perineum on any account. Further, there are those who push the perineum backwards; and those who, for equally plausible reasons, push it forwards. Some dilate the sphincter vaginae; some the sphincter ani; and some who plug it up. Some place their hands transversely across the perineum; some longitudinally with the fingers looking upwards; some longitudinally with the fingers looking downwards; some who attack it with their knuckles. . . . Finally there are those who use the right hand, and those who swear by the left hand. Some who advocate a folded napkin; some an unfolded napkin; and others again who frown down upon all napkins, folded or unfolded. (p. 69-70)

Arguments against the use of support were also numerous and often vehement. Some noted that pressure upon the perineum increased the expulsiveness of the uterine contractions, an undesirable effect at this time in labor (Clarke, 1889; Dewees, 1889; Leishman, 1879). Goodell (1871) observed that manual pressure on the posterior and middle portion of the perineum prevented the lateral portions from bearing their share of tension. Thus they don't yield as they should and subsequently tend to put extra strain on the central portion which is then more likely to tear. Some authors claimed that any manual pressure thins the perineum excessively or causes decreased circulation which predisposes to tearing (Goodell, 1871). Leishman (1879) concluded that support of

the perineum was irrational and useless in all cases and undoubtedly hurtful in some. He stated:

Two points must here be borne in mind; that the perineum must sooner or later yield, and that support necessarily implies opposition to the progress of the head. If, therefore, we admit support as a rule of practice, we shall find ourselves opposing a natural process, and presuming to teach nature a lesson. (p. 269)

And Goodell (1871) once again prosaically summarized the argument against the use of perineal support:

Nature in all her operations intends to adapt means to ends, and the perineum was certainly not created to be torn, unless shored up by the hand of the physician. It unfortunately labors under the disadvantage of lying on the external surface of the body and its distention is really the only visible process of parturition. Were the os uteri or the uterus itself equally visible and tangible, I doubt not we would be frightened into encircling them with our hands, greasing them, folding towels about them, etc., etc. Fortunately for their integrity they lie out of sight and out of reach. (p. 71)

Another early method of preserving the perineum was the use of the obstetric chair or stool. It was used universally for many years and was supposed to protect the perineum by maintaining the child's head in the axis of the pelvic canal. But according to Goodell (1871), its success in preventing lacerations was its positioning the woman in such a manner as to prevent manual assistance and intervention.

Anesthesia (chloroform or ether) was employed by Villarama (1926) to relax the entire muscular system--including the perineal muscles. This relaxation, he claimed, was the best means of

preserving the intact perineum. Similarly, Shortland (1958) used "open-ether-flooding-to-stertor" to obtain complete muscular relaxation. An obstetrician with many years of experience, he has performed only one episiotomy and claims that "the complete muscular relaxation afforded by this procedure has enabled me to keep intact many and many a perineum" (p. 373).

For at least a century it has been recognized that the "danger from laceration is least when the perineum dilates slowly and equably" (Goodell, 1871, p. 73). According to Leishman (1879), the proper management of the perineum requires watching the amount of pressure and gauging the degree of propulsive force being exercised. He maintained:

Should this exceed the normal standard, so as to imperil the integrity of the tissues, we must then order all aids to expulsive effort to be removed from the reach of the patient, and at the same time encourage her to cry out lustily during the height of a pain, or, in other words, to make free use of the safety valve of the glottis. (p. 270)

The modern equivalent requires eliciting the woman's cooperation and having her pant rather than push to deliver the head, and by delivering the head at the end of or between contractions (Myles, 1975, p. 281). When the perineum becomes taut and shiny, Sheila Kitzinger (1972, p. 201-202) recommends that the woman push only when the urge to push is irresistible. She should try to stop pushing and pant and blow to avoid bearing down until the perineum is no longer rigid.

Today by far the most popular method of perineal protection is

the episiotomy. The procedure was first defined and described in 1742 by Sir Fielding Ould, an Irish man-midwife, in his Treatise of Midwifery (in Laufe & Leslie, 1972). It was brought to American attention in 1878, and popularized in 1918 by Pomeroy who advocated its routine use in primiparas to reduce pressure on the fetal head. Delee in 1920 recommended the use of episiotomy and forceps to increase comfort in labor, reduce blood loss, preserve the pelvic floor, and protect babies from injury associated with the second stage of labor (Cogan & Edmunds, 1977).

In the United States today, episiotomy is said to be the most common obstetrical procedure with the exception of the ligation of the umbilical cord. Its incidence is estimated to be between 70% and 95% of all vaginal deliveries, and was even as high as 88% in a defined population of women who had taken prepared childbirth classes (Cogan & Edmunds, 1977).

Proponents of routine episiotomy claim its advantages to the mother and to the baby to be considerable. For the mother: (1) a straight incision is easier to repair and heals faster than a jagged laceration; (2) the integrity of the pelvic floor muscles can be maintained and uterine prolapse, cystocoeles, and rectocoeles can be prevented by performing the episiotomy before the muscles are excessively stretched; (3) the anterior tissues of the bladder, urethra, and clitoris are protected as more room is available in the posterior; (4) the

duration of second stage is shortened which is generally believed to reduce fetal and maternal morbidity. For the baby, an episiotomy reduces the pounding of the baby's head against the perineum, and may thus avert brain damage (Pritchard & MacDonald, 1976, p. 346; Oxorn & Foote, 1975, p. 407).

There are certain instances, other than routine, where an episiotomy may be desirable. Maternal factors include a thick, resistant perineum, a short perineum, or where large lacerations seem likely. Fetal factors include premature or sick babies, large babies, abnormal positions or presentations, or fetal distress necessitating rapid delivery (Oxorn & Foote, 1975, p. 407).

Several authors recognize the value of episiotomy in these special situations, but argue vehemently against their routine use. Doris Haire (1972) maintained that the research does not indicate that episiotomy reduces the incidence of pelvic relaxation (including uterine prolapses, cystocoeles, and rectocoeles), or even the incidence of perineal lacerations. Extensions of episiotomies and other lacerations were also reported in 2% to 22% of the cases in the literature reviewed by Cogan and Edmunds (1977). In addition, episiotomies are usually deeper than the first degree lacerations that might otherwise have occurred.

In spite of the fact that most authorities (and subsequently most practitioners) subscribe to the importance of a short second stage of labor (Myles, 1975, p. 271; Oxorn & Foote, 1975, p. 526), a

retrospective study by Cohen (1977) of 4,403 primiparas indicated no significant difference in perinatal outcome or maternal morbidity between those with short and those with long second stages. Similarly, a long-term study of the neurological development of children by Butler and Alberman (in Cogan & Edmunds, 1977) showed no relationship between the force or the length of delivery in normal labor and the subsequent neurological development of the child.

Episiotomies are described as having additional disadvantages, as well. Episiotomy pain is recognized as a major discomfort of the postpartum period (Beischer, 1967; Cogan & Edmunds, 1977). Suzanne Arms (1975) blames episiotomies for the "bowlegged, tender shuffling and squeamish sideways sitting which so many people associate with motherhood" (p. 79).

In addition to being a source of postpartal pain, the episiotomy may disrupt family relationships. The repair of the episiotomy occurs during the "maternal sensitive" period immediately after birth when the maternal-infant bond is beginning to be formed. Cogan and Edmunds (1977) suggest that this may have implications for the subsequent development of the maternal-infant relationship. The husband-wife relationship may also be disrupted by post-episiotomy dyspareunia to be as high as 39% among patients with episiotomies, with 6% of these women having long-lasting problems.

Other disadvantages of episiotomies mentioned in the literature

include excess blood loss and unsatisfactory anatomic results (e.g., skin tags, slight assymetry or excessive narrowing of the introitus, recto-perineal and rectovaginal fistulas) (Cogan & Edmunds, 1977). Hodgkinson (1958) strongly claimed, "Episiotomy is a relic of the barbaric age and should never be done" (p. 373).

The outspoken opposition to episiotomies (as well as to other routine obstetrical procedures) in recent years by professionals and by consumers has spurred an increased interest in alternative methods of perineal preservation.

One relatively new method is described by O'Leary and Erez (1965). They injected hyaluronidase, an animal enzyme that temporarily destroys the connective tissue ground substance, into the perineums of 50 primiparas and compared the results with a matched control group. They reported that thirty of the fifty in the experimental group had intact perineums as compared with ten of the fifty in the control group. They reported no significant difference between the two groups in the pelvic support at their six-week postpartum visit. Chatfield (1966), however, challenged the results of O'Leary and Erez. Fifty-seven women were injected with hyaluronidase in normal saline, sixty-six were injected with just normal saline, and seventy-seven were not injected. Experimenter bias was eliminated, as the obstetrician was unaware of which solution he was injecting, and thus not influenced in his decision to perform an episiotomy. Even though more intact perineums were obtained with the use of

hyaluronidase, the difference between the groups was not statistically significant. He concluded that hyaluronidase had no useful effect on the perineum in labor, as it did not reduce the need for episiotomies or the incidence of perineal lacerations. There have been no subsequent studies on this issue.

Although Goodell (1871) makes a passing reference to the early use of warm baths as a means of protecting the perineum, the use of moist heat is otherwise not mentioned in the medical literature. Moist heat is an alternative method of perineal preservation that is being used in some areas today. As recently as twenty years ago, midwives in Italy applied hot, wet gauze pads to the perineum during the second stage of labor to help them deliver over an intact perineum. Their incidence of episiotomies and lacerations was reportedly very low (Calabrese, 1978).

In the search for methods of delivering over an intact perineum, many midwives have turned to the old methods, including lubricants, perineal support and massage, and obstetric chair.

A modern equivalent of the obstetric stool is the obstetric table that raises the mother into a sitting position during delivery. This is thought to widen her pelvis and reduce the need for episiotomies (Sousa, 1976, p. 40). It is believed that the commonly used dorsal lithotomy position stretches the perineal tissue and increases the incidence of lacerations (Sousa, 1976, p. 38).

The use of perineal support remains controversial today. Lang

(1972) suggests using a steady upward and inward pressure on the outer borders of the perineum to reduce tension on the perineum. Similar to perineal support is the use of perineal massage. Lang (1972) recommends massaging the perineum to check for relaxation. She suggests inserting two lubricated fingers between the vaginal mucosa and the baby's head, pulling down and to each side to help stretching and to check for tension. This is done several times and only between contractions. Sousa (1976, p. 161) also recommends massaging the perineum between second stage contractions, but with an oil rich in vitamin E. It is thought that this will stimulate perineal circulation and reduce the incidence of tearing. Myles (1975), on the other hand, represents those who claim that any pressure of the fingers on the perineum thins the tissue or causes bruising and leads to subsequent tearing. The controversy continues.

Nurse-midwives are among those practitioners interested in learning old and new ways of delivering over an intact perineum. It has been this author's experience that whenever a group of nurse-midwives get together, the topic of conversation invariably turns to methods used to protect the perineum. This interest may generally be attributed to the nurse-midwife's commitment to normal, non-interventive obstetrics and a strong consumer orientation. As increasing numbers of consumers are requesting delivery without episiotomies if possible, nurse-midwives want to be better prepared to meet these requests.

It would be helpful for practitioners to know not only those

techniques that have been used to facilitate delivery over an intact perineum, but those that have been used most successfully. Accordingly, the purpose of this study is to determine the attitudes of nurse-midwives concerning delivery over an intact perineum, their techniques utilized to facilitate delivery over an intact perineum, and the effectiveness of these methods.

CHAPTER II

METHODOLOGY

This survey was conducted by written questionnaire (Appendix A) mailed to a convenience sample of 175 Certified Nurse-Midwives. Random selection of the sample was not possible since there is no published master list of C.N.M.s in the United States. Approximately 85% of Certified Nurse-Midwives in this country are members of their professional organization, the American College of Nurse-Midwives. From this organization, names of A.C.N.M. Committee, Division, and Board members, nurse-midwifery education program directors, and nurse-midwifery service directors were obtained (A.C.N.M., personal communication). In addition, names of C.N.M.s listed in the current International Child-birth Education Association member roster and those known to University of Utah nurse-midwifery faculty and student nurse-midwives were pooled. Each was sent a questionnaire.

Each Certified Nurse-Midwife was also sent a letter describing the purpose of the study (Appendix B) and a return self-addressed stamped envelope to encourage participation. He/she was requested to complete the questionnaire and return it by mail to the investigator before a deadline established at four weeks after distribution of the letters. Return of the questionnaire implied participator consent.

The questionnaire was developed by the investigator and included questions concerning the following subject areas:

1. Attitudes regarding delivery of infant over episiotomies or intact perineums.
2. Methods and techniques used during pregnancy, and first and second stage of labor when planning to deliver over an intact perineum.
3. Techniques for delivery over an intact perineum that have been used most successfully.
4. Techniques that have been used and found detrimental to maintaining an intact perineum.
5. Demographic data of the practitioners' client populations.
6. Statistical data for each practitioner relative to the total number of deliveries within a specified one-year period, the total number of deliveries attempted over intact perineums, and the number of these deliveries successfully done over intact perineums.

A list of defined terms can be found in Appendix C.

CHAPTER III

RESULTS AND DISCUSSION

Questionnaires were mailed to a convenience sample of Certified Nurse-Midwives to determine their attitudes concerning delivery over an intact perineum, their techniques utilized to facilitate delivery over an intact perineum, and the effectiveness of these methods. Of the 175 questionnaires mailed out, 113 were returned completed and used for data analysis. An additional six were returned unanswered or incomplete with notes explaining that the recipient had not had intrapartum work experience. Five were returned by the post office for inability to delivery as addressed.

Analysis of the data included frequency distributions, measures of central tendency, and Chi Square crosstabulations and Spearman Rho correlation coefficients to measure the association among variables. Since the respondents were allowed to select more than one answer for most questions, the frequency data percentages do not always add up to 100%. Where "other" was an option, the most frequent "other" responses are represented in the data analysis.

Demographic Data

The years in which the participants graduated from nurse-midwifery school ranged from 1935-1978; more than 50% of the sample graduated

since 1972. The number of years of clinical practice similarly ranged from three months to thirty years with a mean of 5.7 years; 50% of the sample had four years or less of clinical experience. The skewed distribution of this sample toward more recent graduates with fewer years of clinical practice is probably representative of C.N.M.s in general. It can be attributed to the increased number of nurse-midwifery programs established in recent years, as well as to the increased number of students graduating from each program.

Twenty-two schools of nurse-midwifery are represented, including a school each in Scotland, Ireland, England, and Puerto Rico. Of the 79 who said they were taught in school how to delivery over an intact perineum, 27 (34%) use the method they had been taught, 3 do not, and 49 (62%) use a modified version. Participants are currently practicing in 34 states and the District of Columbia.

The racial distribution of the respondents' client populations is approximately 63% Caucasian, 21% Black, .8% Asian, 6.5% Chicano, 6% Native American, 1.8% other. Twenty-six of the 113 respondents (23%) reported that they work with a population with unusually poor tissue integrity. Of these, 14 respondents blamed it on poor nutrition, 8 on chronic vaginitis, and 4 on low socioeconomic status. Participants were asked approximately what percent of their clients are prepared for labor and controlled during delivery. Of the 100 respondents who answered this question, 54 said that between 75-100% of their clients are prepared

and controlled; another 21 claimed that 50-75% of their clients are prepared and controlled. The participants were then asked the approximate percent of their clients that request delivery over an intact perineum. Of the 99 who answered this question, 24 said that 75-100% of their clients make this request; 48 reported that only 0-25% of their clients request delivery over an intact perineum.

Attitudes Concerning Delivery over an Intact Perineum

Ninety-one of the respondents claimed they would always prefer to deliver over an intact perineum, if possible. When asked if they would rather do an episiotomy or allow a first degree laceration, 31 (27%) stated they would do an episiotomy; 75 (66%) would rather allow a first degree laceration. A Chi Square crosstabulation indicated that those who prefer to deliver over an intact perineum are more likely to allow a first degree laceration than to cut an episiotomy (significance = .02).

Participants were asked if they do routine episiotomies. An overwhelming 96% (109) said they do not; two do them routinely on primiparas; two do episiotomies routinely on all clients. The latter two, however, indicated that they currently work for physicians/institutions who require or strongly recommend routine episiotomies.

Techniques Utilized to Facilitate Delivery
over an Intact Perineum

The frequency of responses following represents only those 111 participants who do not do routine episiotomies on all clients.

Participants were asked about information they provide during pregnancy to prepare the client for delivery over an intact perineum. The most frequent topics taught include breathing and pushing techniques (91%), Kegels exercise (84%), and tailor sitting/squatting (76%) (Table 1).

Table 1
Frequency and Percentage of Topics Taught by C.N.M.s
during Pregnancy to Prepare Clients for Delivery
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Breathing and pushing techniques	101	91
Kegels	93	84
Tailor sitting/squatting	84	76
Perineal massage	34	31
Vaginal stretching	25	23
Use of herbal preparations	10	9
Other:		
Vitamin E	6	5
Other	7	6

Considerably fewer techniques are employed by respondents during the first stage of labor. The most frequent technique utilized is perineal massage (25%); 18% use heat (Table 2). Chi Square cross-tabulations indicate that the different techniques used during the first stage of labor are likely to be used by the same practitioners (significance = $< .01$).

Subsequent questions referred to techniques used during the second stage of labor to facilitate delivery over an intact perineum. When asked whether they use any special anesthesia when planning to deliver over an intact perineum, 77 (69%) replied that they use no anesthesia; 34 (31%) use pudental blocks; 16 (14%) use local anesthesia (Table 3). Chi Square cross-tabulations indicate that local anesthesia and pudental blocks are likely to

Table 2

Frequency and Percentage of Techniques Used by C.N.M.s
during the First Stage of Labor in Preparation for
Delivery over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Perineal massage	28	25
Application of heat	20	18
Use of oils, emollients	13	12
Other	5	5

Table 3

Frequency and Percentage of Anesthesia Used by C.N.M.s
When Planning to Delivery over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
None	77	69
Pudental	34	31
Local	16	14
Other	4	4

be used by the same practitioners (significance = $< .01$).

When asked if they use any agents during second stage, 27 respondents (24%) reported they use heat; 26 (23%) use oils or emollients. Other agents are used less frequently (Table 4).

The maintenance of flexion was reported as the most commonly used method of controlling the delivery of the head when attempting to maintain an intact perineum (77%) (Table 5).

Concerning the actual management of the perineum during delivery, 22 (20%) reported that they avoid touching the perineum altogether. Eighty-three (75%) reported that they use some kind of perineal support. Pictures drawn to depict the direction of support and/or tissue manipulation indicated that pinching the tissue medially and directly supporting the perineum

Table 4

Frequency and Percentage of Agents Used by C.N.M.s
during Second Stage When Planning to Deliver
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Heat, dry or moist	27	24
Oils or emollients	26	23
Herbal preparations	3	3
Hyaluronidase	0	0
Other	3	3

Table 5

Frequency and Percentage of Delivery Methods
Used by C.N.M.s When Planning to Deliver
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Maintain flexion	86	77
Ritgen maneuver	12	11
Other:		
Modified Ritgen	6	5
Other	4	4

(without tissue manipulation) are the two most frequent types of support provided, with 38 (27%) and 28 (25%) responses, respectively. Eighty-three respondents (75%) also reported using some kind of perineal massage, with "ironing out" the perineum from inside the vagina by far the most frequent massage technique utilized (64%) (Table 6). Chi Square cross-tabulations indicate that perineal massage and perineal support are likely to be used by the same practitioners (significance = $< .01$).

When asked what maternal positions are preferred when planning to deliver over an intact perineum, 93 (84%) replied that they prefer the lithotomy position (flat or raised) without stirrups. Lateral Sims is used by 52 (47%) of the respondents (Table 7).

When asked what pushing variations are preferred when attempting to deliver over an intact perineum, 80 respondents (72%) reported using gentle, intermittent pushing to comfort; 48 (43%) said they use a mirror to help guide pushing (Table 8).

Two open-ended questions asked for descriptions of the techniques found to be most successful and most detrimental to delivery over an intact perineum. Participants reported that the techniques they use most successfully include having a controlled, prepared, client, a delivery position with legs relatively close together, using gentle pushing and pushing between contractions, assuring a very slow delivery and delivery between contractions, maintaining flexion of the baby's head, and having the woman pant or breathe the head out. Many stressed that control of

Table 6

Frequency and Percentage of Techniques Used by C.N.M.s
to Manage the Perineum When Planning to Deliver
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Avoid touching the perineum altogether	22	20
Perineal support	83	75
Kinds of support:		
Draw tissue medially	30	27
Support only--no tissue manipulation	28	25
Draw tissue upwards	11	10
Other	11	10
Perineal massage	83	75
Kinds of massage:		
"Iron out" perineum from inside vagina	71	64
Massage external perineum with rotary motion	16	14
Massage external perineum with lateral motion	15	14
Other	4	4

Table 7

Frequency and Percentage of Positions Preferred by
C.N.M.s When Planning to Deliver
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Lithotomy without stirrups (flat/raised)	93	84
Lateral Sims	52	47
Lithotomy with stirrups	15	14
Squatting	10	9
Hands and knees	7	6
Other	2	2

Table 8

Frequency and Percentage of Pushing Variations Preferred
by C.N.M.s When Planning to Deliver
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Gentle and/or intermittent pushing to comfort	80	72
Using a mirror to guide pushing	48	43
Stop pushing when feel burning	24	22
Pushing as hard and long as possible	14	13
Other:		
Pushing between contractions	8	7
Have mother feel fetal head with hand	7	6
Other	18	16

the birth of the shoulders is just as important as control of the head (Table 9).

The techniques that participants reported most often to be detrimental to delivery over an intact perineum include using stirrups and/or having the legs far apart, hard pushing, hurrying, and having an unprepared, uncontrolled client (Table 10).

Table 9
Frequency and Percentage of Techniques Reported by
C.N.M.s to Be Most Helpful to Successful
Delivery over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Slowness of delivery	39	35
Controlled mother	32	29
Legs close together	27	24
Flexion of head	25	23
Deliver between contractions	20	18
Gentle pushing	18	16
Panting or breathing the head out	18	16
Prepared mother	18	16
Control the shoulders	12	11
Push between contractions	11	10
Perineal massage	11	10
Other	34	31

Table 10

Frequency and Percentage of Techniques Reported by
C.N.M.s to Be Detrimental to Delivery
over an Intact Perineum
(N=111 respondents)

	Frequency	Percentage
Stirrups and/or legs wide apart	33	30
Hard pushing	18	16
Uncontrolled or unprepared mother	16	14
Rushing; rapid delivery	12	11
Local anesthetic	9	8
Ritgen's maneuver	8	7
Other	16	15

Chi Square crosstabulations indicated that participants who utilize unconventional techniques (e.g., herbs, oils, heat, hands and knees and squatting positions) are likely to use other unconventional techniques, as well (significance = $< .01$). In addition, they showed that specific techniques are usually used consistently. If participants use herbs or massage during pregnancy, they are also likely to use herbs or massage during labor. Oils and heat are similarly used consistently in the first and second stages of labor (significance = $< .01$).

Incidence and Success of Delivery
over an Intact Perineum

The success of the techniques utilized by nurse-midwives was unable to be determined from the available data. However, information regarding the number of total deliveries, the number of deliveries attempted over an intact perineum, and the number of successful deliveries over an intact perineum since January 1, 1978 was obtained from 36 of the 113 respondents. Of these 36, the total number of deliveries was 2,257, with an individual range from 3-225. The total number of attempted deliveries was 1494, with an individual range from 2-200. The total number of successful deliveries was 713, with an individual range from 1-98. Thus, 60% of all deliveries by these 36 nurse-midwives were attempted over an intact perineum. Of those attempted, 48% were successful. The individual success rates of the 36 respondents were determined by dividing their number successful by number attempted. These success rates were very widespread, and ranged from 8% to 100%.

These results must be interpreted with caution. In addition to this being a very small sample of 36, the figures provided are from recall data and not necessarily from actual records. Therefore, they may be approximations of the actual numbers of deliveries and successes. Furthermore, some of these data represent small numbers of deliveries. With few deliveries there is more opportunity to have chance successes or failures than with larger numbers of deliveries.

The influences on success of poor tissue integrity, racial distribution of clients, and personal attitudes regarding delivery over an intact perineum were analyzed and determined to be non-contributory. Thirty-two of the 36 respondents denied that they work with a population with unusually poor tissue integrity. The four who do work with clients with poor tissue integrity all had success rates of 60% or better. The racial distribution appears to be similar among the more and less successful. Twenty-eight of these 36 respondents prefer to always deliver over an intact perineum if possible (missing data = 1). The 7 who do not prefer to deliver over an intact perineum had widespread, varying rates of success.

There is no correlation between success and the number of years of clinical practice as determined by a Spearman Rho correlation coefficient ($R = -.25$; not significant).

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine the attitudes of nurse-midwives concerning delivery over an intact perineum, their techniques utilized to facilitate delivery over an intact perineum, and the effectiveness of these techniques.

Questionnaires were mailed to 175 C.N.M.s. One hundred and thirteen were returned completed; delivery statistics were provided by only 36 of the respondents. The data was analyzed with frequency studies, measures of central tendency, and Chi Square and Spearman Rho measures of association. The available delivery statistics were used to analyze the incidence and success of delivery over an intact perineum.

More than half of the 113 respondents in this study graduated from nurse-midwifery school within the past six years and have four years or less of clinical practice.

A large majority of the respondents do not do routine episiotomies and prefer to attempt delivery over an intact perineum, even if that means allowing a first degree laceration.

Varied and numerous techniques are used by these C.N.M.s to facilitate delivery over an intact perineum. A large majority of them

teach breathing and pushing techniques, Kegels exercise, and tailor sitting/squatting during pregnancy. Most do not use any special techniques during the first stage of labor.

During the second stage of labor, most of the participating practitioners prefer to use no anesthesia, to maintain flexion of the baby's head, and to use some kind of perineal massage or support. The preferred positions for delivery are the lithotomy position (flat or raised) without stirrups and the lateral Sims position. Gentle, intermittent pushing is preferred.

In response to an open-ended question, respondents reported that the techniques they use most successfully include having a controlled, prepared client, a delivery position with legs relatively close together, using gentle pushing and pushing between contractions, assuring a very slow delivery and delivery between contractions, maintaining flexion of the baby's head, and having the woman pant or breathe the head out.

The techniques that participants reported most often to be detrimental to delivery over an intact perineum include using stirrups and/or having the legs far apart, hard pushing, hurrying, and having an uncontrolled, unprepared client.

Success rates were calculated for the 36 respondents for whom delivery statistics were available. Success was neither related to the race or tissue integrity of client populations, nor to attitudes about delivery over intact perineums. There was no correlation between success and the number of years of clinical practice.

From the results of this study and from comments received with the questionnaire, it can be concluded that there is a tremendous amount of interest on the part of C.N.M.s to learn more and better ways of delivering over an intact perineum. A great majority prefer to deliver over an intact perineum whenever possible.

It can also be concluded that the efforts of present-day nurse-midwives to protect the perineum during childbirth are as varied and numerous as those that have been used historically. The old methods--oils, heat, support, massage, herbs--are all represented in current practice.

Several factors contributed to the limitations of the study. Circumstances out of the control of the investigator made it impossible to randomly select the sample. In addition, the questionnaire would have yielded better data had it been worded differently. Instead of allowing more than one answer to each question, participants should have been asked to rank the selections in order of preference or to select the ONE most appropriate answer. The questionnaire could have been worded more carefully to elicit specific details.

Recommendations for further study can be made based on the results of this study. Prospective data on large numbers of deliveries can be used to evaluate methods used to facilitate delivery over an intact perineum. Records should be kept of each delivery, including methods used (e.g., position, perineal support); maternal and fetal factors (e.g., race, age, tissue integrity, fetal size and weight); and perineal outcome (e.g., degree

of laceration, intact, reason for cutting episiotomy). Analysis of categorical data by linear models (Landes, et al., 1976) would indicate the contribution of all factors to perineal outcome.

The results of this study have several implications for nurse-midwifery practice and education. Certain methods have been reported to contribute to successful delivery over an intact perineum. If these could be more conclusively identified with further research, it could positively effect nurse-midwifery management. C.N.M.s would be better able to meet the needs of the increasing numbers of consumers who are requesting delivery over an intact perineum, as well as to meet their own objective of being able to successfully deliver over an intact perineum. In addition, it is important that childbirth educators be made aware that their current preparation of couples for labor and a controlled delivery is reported by many C.N.M.s to contribute to successful delivery over an intact perineum. Teaching breathing and pushing techniques, Kegels exercise, and tailor sitting/squatting is helpful and should be continued.

The results of this study also have implications for nurse-midwifery education. Only 79 of the 113 participants reported that they had been taught in nurse-midwifery school how to deliver over an intact perineum. In light of the interest expressed, this topic should be included in the curriculum of all nurse-midwifery programs. In addition, since most of the participants who had been taught this in school reported that they presently use the method they had been taught or a modification thereof,

it is important that students are taught methods of delivering over an intact perineum that are used most successfully. Furthermore, many students are disconcerted by their exposure to the varying techniques used by their different clinical instructors to facilitate delivery over an intact perineum. It is important that they be made aware that these varied and numerous techniques are, in fact, representative of current nurse-midwifery practice.

APPENDIX A

QUESTIONNAIRE

Nurse-midwifery school attended (optional) _____

Year graduated _____ (check here if you are currently a student _____)

Number of years in clinical practice _____

State in which you are currently practicing _____

1. Were you taught in nurse-midwifery school how to deliver over an intact perineum? yes _____ no _____

If yes, do you presently use the method you had been taught?

yes _____ no _____ modified _____

2. Based on your knowledge of anatomy and your personal philosophy, would you prefer to always deliver over an intact perineum if possible?

yes _____ no _____

3. Would you prefer to do an episiotomy or allow a first degree laceration?

episiotomy _____ 1^o laceration _____

4. Do you do routine episiotomies? yes, on all clients _____

yes, on all primips _____ no, not routinely _____

If yes, do you work for a physician/institution who requires or strongly recommends routine episiotomies?

yes _____ no _____

5. In preparation for delivery over an intact perineum, do you teach any of the following during pregnancy?

breathing and pushing techniques	yes _____	no _____
perineal massage	yes _____	no _____
vaginal stretching	yes _____	no _____
Kegels	yes _____	no _____
tailor sitting/squatting	yes _____	no _____
use of herbal preparations	yes _____	no _____
other _____		

6. In preparation for delivery over an intact perineum, do you use any of the following techniques during the first stage of labor?

application of heat	yes _____	no _____
use of oils, emollients	yes _____	no _____
perineal massage	yes _____	no _____
other _____		

7. When planning to deliver over an intact perineum, do you use any special anesthesia?

local _____ pudendal _____ none _____ other _____

8. When planning to deliver over an intact perineum, do you use any of the following agents during second stage? (If yes, please specify)

oils or emollients	yes _____	no _____
herbal preparations	yes _____	no _____
heat, dry or moist	yes _____	no _____
hyaluronidase	yes _____	no _____
other _____		

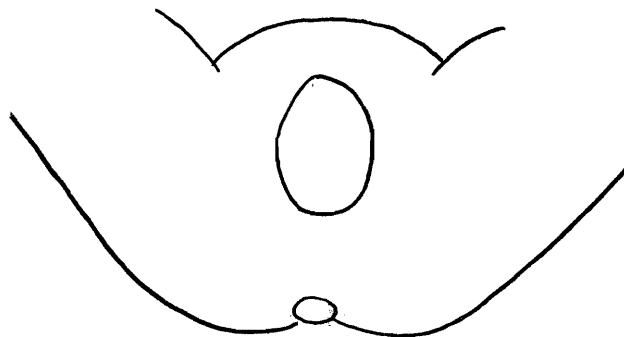
9. When planning to deliver over an intact perineum, which of the following delivery methods do you use most often?

maintaining flexion _____
 Ritgen maneuver _____
 other _____

10. When planning to deliver over an intact perineum, do you use any of the following techniques?

a. avoid touching the perineum altogether	yes _____	no _____
b. perineal support	yes _____	no _____

(If yes, please draw a hand in the position where you apply support and/or indicate with arrows the direction in which you pull or push the perineal tissue)



c. perineal massage yes _____ no _____

(If yes, please check the technique most like your own)

iron out perineum from inside vagina _____
 massage external perineum with rotary motion _____
 massage external perineum with lateral motion _____
 other _____

11. When planning to deliver over an intact perineum, do you prefer any of the following positions?

lithotomy with stirrups	yes _____	no _____
lithotomy without stirrups	yes _____	no _____
lateral Sims	yes _____	no _____
hands and knees	yes _____	no _____
squatting	yes _____	no _____
other _____		

12. When planning to deliver over an intact perineum, do you prefer any of the following pushing variations?

pushing as hard and long as possible	yes _____	no _____
stop pushing when feel burning	yes _____	no _____
gentle and/or intermittent pushing		
to comfort	yes _____	no _____
using a mirror to guide pushing	yes _____	no _____
other _____		

13. Please briefly describe the technique(s) you've found most helpful and/or use most successfully to deliver over an intact perineum.

14. What techniques have you tried and found detrimental to delivery over an intact perineum?

15. Have you had any consistently poor results from delivering over intact perineums? yes _____ no _____ If yes, due to:

poor muscle tone	yes _____	no _____
poor tissue approximation from lacerations	yes _____	no _____
tearing down previous episiotomy scar	yes _____	no _____
other _____		

16. Do you feel like you work with a population with unusually poor tissue integrity? yes _____ no _____ (if yes, please clarify)

17. Approximately what percent of your clients are:

Caucasian _____	Chicano _____
Black _____	Native American _____
Asian _____	Other _____

18. Approximately what percent of your clients are prepared and controlled during delivery?

75-100% _____ 50-75% _____ 25-50% _____ 0-25% _____

19. Approximately what percent of your clients request delivery over an intact perineum if possible?

75-100% _____ 50-75% _____ 25-50% _____ 0-25% _____

20. How many deliveries have you done since January 1, 1978? _____
(Check here if unknown _____)

How many of these were primips? _____ (unknown _____)

Since January 1, 1978, how many deliveries did you attempt to do over intact perineums (i.e., no episiotomies)? _____ (unknown _____)

How many of these were primips? _____ (unknown _____)

Since January 1, 1978, how many deliveries did you successfully do over intact perineums (i.e., no episiotomies, no lacerations)? _____
(unknown _____)

How many of these were primips? _____ (unknown _____)

21. Do you have any additional suggestions or comments?

For a copy of the results of this survey:

Name:

Address:

THANK YOU VERY MUCH!!!

APPENDIX B

COVER LETTER TO PARTICIPANTS

927 E. 800 S. #10
Salt Lake City, Utah 84102
December 15, 1978

Dear

I am a second year graduate student in nurse-midwifery at the University of Utah.

It has been my experience that whenever a group of nurse-midwives get together, the topic of conversation invariably will turn to ways of delivering over an intact perineum. It seems like we are all eager to learn from one another methods and techniques that have been used successfully. It is for this reason that I have chosen, for my thesis research, to conduct a survey to determine what methods are being used by nurse-midwives to maintain intact perineums. If significant data is obtained, this information will hopefully be published to be shared with nurse-midwives across the country.

Enclosed is a questionnaire and a self-addressed stamped envelope. I would appreciate it very much if you would complete the questionnaire and return it to me by January 15, 1979.

I will be happy to share the results of this survey with you. Please indicate your interest in the space provided at the end of the questionnaire.

Thank you, in advance, for your time and cooperation.

Sincerely yours,

Karen Vigdor-Odato

APPENDIX C

LIST OF DEFINED TERMS

Hard pushing -- the traditional method of pushing a baby out; requires the mother to bear down as hard and long as she can, usually with the coaching of those in attendance to "push, push, push!"

Gentle/intermittent pushing -- pushing only hard enough to increase comfort and usually only with the urge to push.

Kegels exercise--exercise that tightens and relaxes the pelvic floor muscles. Used to enable the woman to relax those muscles completely during childbirth and to tone them up afterwards. Can prevent cystocoeles, rectocoeles, uterine prolapse.

Maintain flexion -- provide pressure on the baby's head as it crowns to prevent too rapid extension which could tear perineal tissue.

"Ironing out" the perineum from inside the vagina -- stretching the vaginal tissues with one or two fingers around the baby's head as it descends in second stage.

C.N.M. -- Certified Nurse-Midwife designated as certified by the American College of Nurse Midwives.

REFERENCES

- American College of Nurse-Midwives. Personal communication. December, 1978.
- Arms, S. Immaculate deception. Boston: Houghton Mifflin Co., 1975.
- Beischer, N. A. The anatomical and functional results of mediolateral episiotomy. Medical Journal of Australia, 1967, 2, 189-195.
- Calabrese, G. Personal communication, January 1, 1978.
- Chatfield, W. R. The effect of hyaluronidase on the perineum: a controlled study of 200 primigravid patients in labor. Journal of Obstetrics and Gynecology of the British Commonwealth, 1966, 73, 670-671.
- Clarke, A. P. The management of the perineum during labor. Transactions of the American Association of Obstetricians and Gynecologists, 1889, 2, 206-219.
- Cogan, R. and Edmunds, E. The unkindest cut? Contemporary Obstetrics and Gynecology, 1977, 9, 55-59.
- Cohen, W. R. Influence of the duration of second stage labor on perinatal outcome and puerperal morbidity. Obstetrics and Gynecology, 1977, 49(3), 266-269.
- Deweese, W. B. Relaxation and management of the perineum during parturition. Journal of the American Medical Association, 1889, 13, 804-808.
- Goodell, W. A critical inquiry into the management of the perineum during labor. American Journal of Medical Science, 1871, 61, 53-79.
- Greenhill, J. P. & Friedman, E. A. Biological principles and modern practice of obstetrics. Philadelphia: W. B. Saunders Co., 1974.
- Haire, D. The cultural warping of childbirth. Seattle: ICEA Pub./Distrib. Center, 1972.

- Hodgkinson, H. R. Episiotomy. Medical Journal of Australia, 1958, 1, 373-374.
- Kitzinger, S. The experience of childbirth (3rd ed.). Baltimore: Penguin Books, 1972.
- Landis, J. R., Stanish, W. M., Freeman, J. L., & Koch, G. G. Computer Program for generalized Chi Square analysis of categorical data using weighted least squares (Gen. Cat.). Computer Programs in Biomedicine, 1976, 6, 196-231.
- Lang, R. Birth book. Palo Alto: Genesis Press, 1972.
- Laufe, L. & Leslie, D. The timing of episiotomy. American Journal of Obstetrics and Gynecology, 1972, 114, 773-774.
- Leishman, W. A system of midwifery (3rd ed.). Philadelphia: Henry C. Lea, 1879.
- Myles, M. Textbook for Midwives (8th ed.). Edinburgh: Churchill Livingstone, 1975.
- O'Leary, J. & Erez, S. Hyaluronidase as an adjuvant to episiotomy. Obstetrics and Gynecology, 1965, 26, 66-69.
- Oxorn, H. & Foote, W. Human labor and birth (3rd ed.). New York: Appleton-Century-Crofts, 1975.
- Pomeroy, R. H. Shall we cut and reconstruct the perineum in every primipara? American Journal of Obstetrics, 1918, 78, 211-220.
- Pritchard, J. A. & MacDonald, P. C. Williams Obstetrics (15th ed.). New York: Appleton-Century-Crofts, 1976.
- Shortland, L. J. Episiotomy. Medical Journal of Australia, 1958, 1, 266.
- Sousa, M. Childbirth at home. Englewood Cliffs: Prentice-Hall, Inc., 1976.
- Villarama, A. The protection of the perineum. American Journal of Obstetrics and Gynecology, 1926, 11, 823-827.
- White, C. A treatise on the management of pregnant and lying-in women. London: Edward & Charles Dilly, 1793.